

THE MARVELOUS MAPLE

Five Rivers Environmental Education Center
Game Farm Road, Delmar, New York 12054

The information below is designed to assist you in planning your trip to Five Rivers. A general outline of the lesson is included so that you can plan related classroom activities. Please read the information on this page carefully. It is your responsibility to make sure that parents receive clothing information and that chaperones are informed of their duties.

LESSON OUTLINE

The following concepts will be explored in this lesson:

1. A tree manufactures food, in the form of sugar, and stores it for use. People can make use of this sugar for food.
2. This process of making maple syrup involves obtaining tree sap, which contains sugar, and boiling it to remove excess water.
3. Trees can be helped or harmed by people.

CLOTHING INFORMATION

Appropriate clothing is very important. Much of the 45-minute lesson will be held out-of-doors. We offer these suggestions for a more comfortable visit.

1. Wear a hat.
2. Bring mittens or gloves.
3. Wear comfortable walking shoes or boots. Lawns and trails may be muddy.
4. If rain is predicted, bring rain gear.
5. Wear long pants, not shorts or skirts.

INFORMATION FOR CHAPERONES

The success of the program depends a great deal on the chaperone. The chaperone is responsible for the following:

1. Maintaining discipline and keeping the group together.
2. Keeping the group moving when needed or holding the group in a certain place, as indicated by the instructor.
3. Participating and assisting in activities conducted by the instructor.

BEFORE AND AFTER THE CLASS

Please allow time for students to use the rest rooms before the class begins. Both before and after the class, your students are welcome to use the interpreted nature trails, exhibit room, and rest rooms. You are also welcome to use the picnic area, but we have no indoor eating areas.

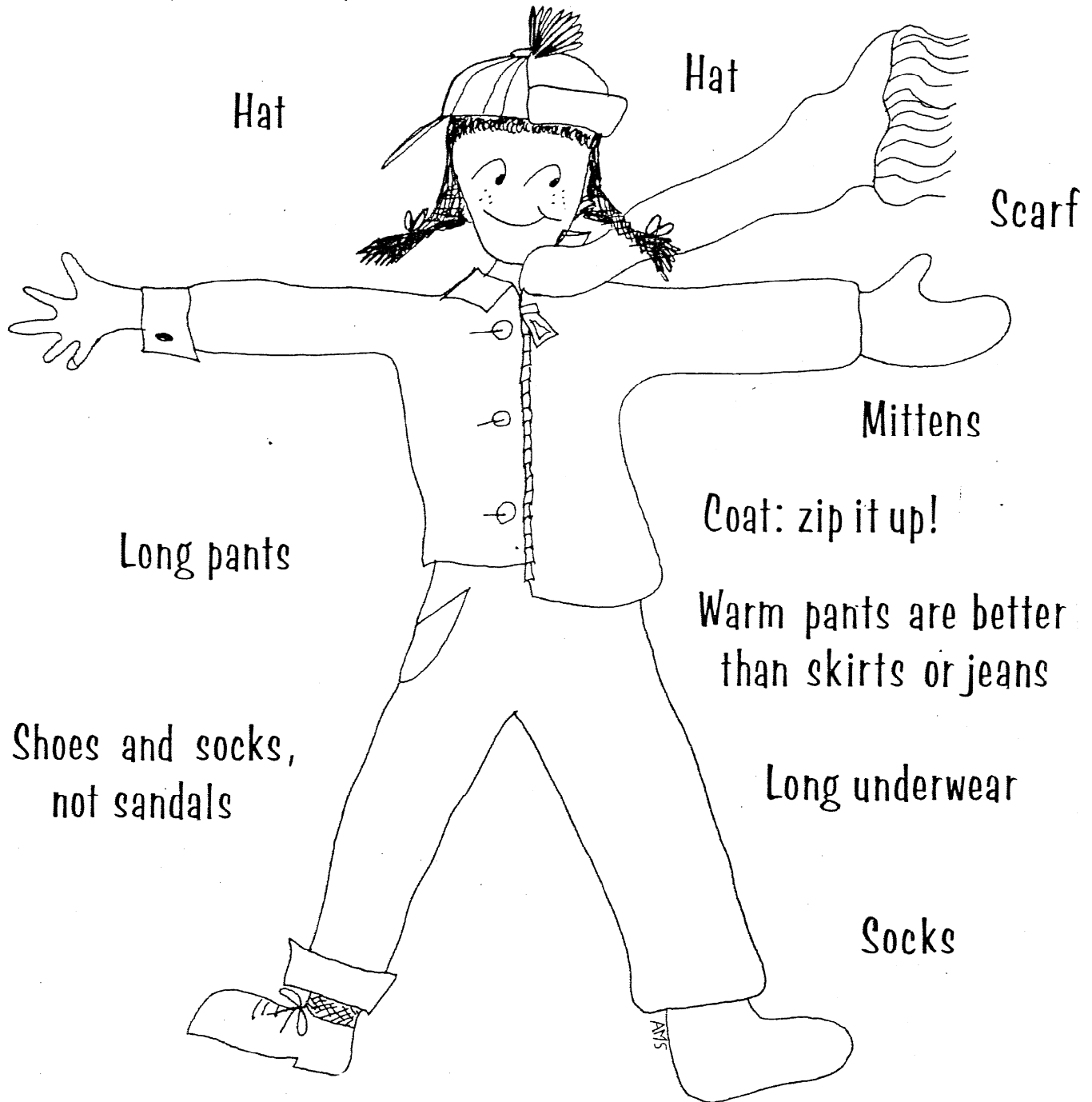
WE LOOK FORWARD TO SEEING YOU AT FIVE RIVERS!

DRESS LIKE ME IN:



SPRING, SUMMER, FALL

WINTER



Hat

Hat

Scarf

Mittens

Long pants

Coat: zip it up!

Warm pants are better than skirts or jeans

Shoes and socks, not sandals

Long underwear

Socks

Old sneakers or boots for aquatic lessons

Boots: at least ankle-high

TREE IDENTIFICATION: YOU CAN ALWAYS TELL A DOGWOOD BY ITS BARK

How can you tell one species of tree from another? By their different leaves, of course. But what happens in winter time when most trees have lost their leaves and they look alike?

Have your class look out the window or, if possible, go outside. Do all trees really look alike, even without their leaves? Have the class suggest some ways trees are different.

Shape

Look at tree shapes and silhouettes. Ask students to stand in postures that imitate different tree shapes. Their arms and fingers can echo the shapes of the branches.

Bark

Look at the barks of different trees. If outdoors, have students feel bark with their bare fingers (no mittens) or even sniff it. Challenge them to come up with one word to describe each type of bark: rough, bumpy, smooth, shaggy.

Create bark rubbings; place a piece of thin paper on the tree trunk and rub the paper hard with the side of a peeled crayon. Examine the different patterns made by different kinds of trees.

Twigs

Gather several different types of twigs from trees, one twig for each student. Have students examine their twig. Some twigs have sticky or furry buds. Some have interesting smells. Use hand lenses to find the bud scales, the hard coverings that protect the buds. Look for little whitish dots on the twigs; these are *lenticels*, or breathing holes through which the twig receives air.

Gently open one bud. It will probably be green inside. Even though the twig looks like a dead stick, it's full of life! Inside each bud are next year's leaves. The tree makes food for itself all summer long, and uses the food to make next year's leaves. The tiny leaves spend the winter hidden beneath the hard bud scales till the warmth and light of spring signal them to start growing.

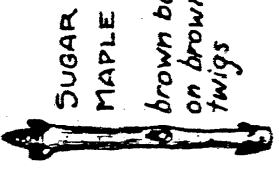
Look at the position of the buds. Are the side buds opposite each other? Or are they placed alternately on the twig? Most trees have alternate buds. But maples have opposite buds, which are small (less than 1/4 inch) and are the color of dark maple syrup. If you bring your twigs to Five Rivers when you come for the maple class, we'll be glad to help you identify them.

Lastly, steal a march on spring. Put the twigs in a glass of water in a warm place. Wait a few weeks. Soon, some of the twigs will be fooled into "thinking" that the warmth of your room is springtime, and some buds will burst forth with green leaves!

SOME CLUES FOR TWIG DETECTIVES

TREES WITH OPPOSITE BRANCHING

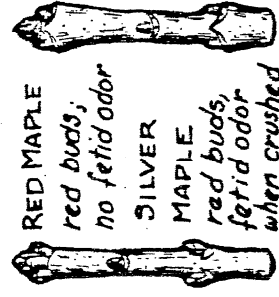
BUDS 1. Smooth buds; crescent-shaped leaf scars with 3 bundle scars



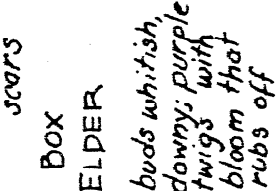
SUGAR MAPLE
 brown buds on brown twigs



NORWAY MAPLE
 green and red buds; keeled scales



RED MAPLE
 red buds; no fetid odor



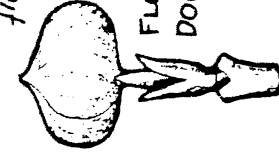
SILVER MAPLE
 red buds; fetid odor when crushed



BOX ELDER
 buds whitish; downy; purple twigs with bloom that rubs off



HORSE CHESTNUT
 buds sticky



FLOWERING DOGWOOD

4. Onion-shaped flower bud

TREES WITH ALTERNATE BRANCHING

BUDS 1. Single scale



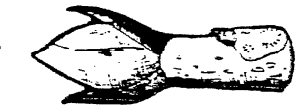
WILLOW
 hood-like scale



BLACK OAK GROUP
 sharp-pointed buds



WHITE OAK GROUP
 blunt buds



SHAGBARK HICKORY
 brownish twigs with light-colored lentils

3. Large end bud with loose dark outer scales



BITTERNUT HICKORY
 granular, mustard-yellow buds

4. Flattened, yellowish buds



SHADBUSH
 scales fringed with hairs

BEECH

TWIGS 1. Thick twig, thick pith



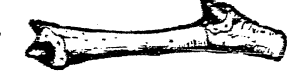
TREE OF HEAVEN



STAGHORN SUMAC
 leaf scar almost encircles bud



TULIP
 "duck-bill" terminal bud



SYCAMORE
 leaf scar encircles bud

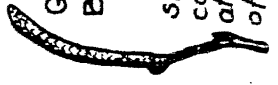
2. Line encircling twig at each node



GINKGO
 twigs peeling in silky fibres

3. Knob-like twigs

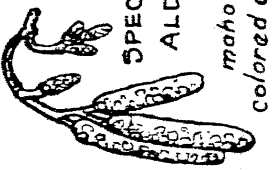
CATKINS in winter



GRAY BIRCH
 single catkin at end of twig



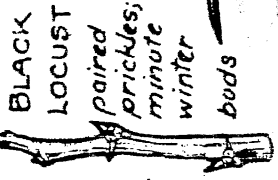
YELLOW BIRCH
 dark, peeling bark.



SPECKLED ALDER
 mahogany-colored catkins



HONEY LOCUST
 minute winter buds; zig-zag twig



BLACK LOCUST
 paired, minute winter buds



HAWTHORN
 round, red buds



BACKGROUND INFORMATION: HISTORY OF MAPLE SUGARING

The Native Americans of the northeast were the first people to discover the secret of the maple's sweet sap. The Algonquins of New York State called maple sugar *sinzibuckwud*, or "drawn from wood," and *sinzibuckwud* time was a season of rejoicing, celebrated with songs and dances. Family groups would camp out in maple groves and spend several weeks in February and March boiling large amounts of maple sap into syrup and sugar. *Sinzibuckwud* time meant that the hard winter was almost over and spring was just around the bend.

The Native Americans had no metal until the coming of the European settlers, so they used materials they found in the forest around them. They cut gashes in the bark of maple trees and caught the sap that dripped out in birch bark baskets. They boiled the sap in hollowed-out logs, stirring it with wooden paddles. The sap was brought to a boil by adding heated rocks to the sap. It was hard to keep syrup without glass or metal containers, so whatever syrup wasn't eaten immediately was boiled further till it turned to sugar and was packed in baskets.

When the European settlers came to America, the Native Americans shared with them the maple's secret. The colonists with their metal tools introduced the system of drilling a small hole and inserting a spout, instead of gashing the tree. Metal spouts (also called spiles), buckets, hooks, and pots made the sugaring process easier and were adopted by many Native Americans as well.

Today, backyard maple sugaring, and the simple sugaring you will see at Five Rivers, use basically the same process the first settlers did. A hole is drilled in a mature maple tree, a spile is inserted, and the sap drips out into a bucket. Buckets are periodically dumped into an *evaporator*, a large pan or pot, over a wood fire. As the sap boils, the water rises off as steam, and what is left behind is the concentrated tree sugar that tastes so good on pancakes.

Large commercial operations may use gas-powered evaporators, or plastic bags and tubing instead of buckets and spiles. But the process remains the same. And each sugaring operation, large or small, starts with the same key ingredient: a grove of healthy, mature sugar maple trees. A maple should not be tapped until it is approximately 40 years old!

But maples are very susceptible to being harmed by pollution, such as the air pollution that causes acid rain. Also, maples have a low tolerance for salt, and many roadside maples have been killed by the application of salt to roads in icy weather. A maple tree, once damaged by careless human use or pollution, is not easily replaced.

Little House in the Big Woods, Laura Ingalls Wilder

This children's classic has an excellent chapter on early American methods of maple sugaring.

Maple sugaring buckets, spiles, and hooks, are available for loan at Five Rivers Teacher Resource Center. The Resource Center has a wealth of educational materials available to educators, including video tapes, posters, lesson plans, and biological specimens.

HOW MAPLE SYRUP WAS DISCOVERED: AN IROQUOIS LEGEND

The Native Americans of New York State had many stories to explain the delicious maple syrup that was such an important part of their lives. Here is an Iroquois tale. As you tell this story aloud, perhaps the class could act it out. Assign one student to play Woksis, one to play Moqua, and the rest of the class to be the members of the tribe.

Long, long ago, the first people had no source of sugar or anything sweet - they never ate candy, syrup, or desserts. Until one day in March, when an Iroquois chief named Woksis decided to go hunting. He picked up his bow and arrows and tomahawk, and was ready to leave when his wife, Moqua, stopped him. She asked him to go to the stream and fill a birch bark pot with water for cooking that night's dinner. Then she went off into the forest to gather acorns.

Woksis was very angry when she asked him for this favor, because cooking was traditionally a woman's job. He was so angry he threw his tomahawk at the pot! It missed the pot and hit the maple tree that the pot was underneath. The tomahawk stuck quivering in the bark, and sap dripped from the cut. Then Woksis stamped off to hunt.

Now it so happened that some of the sap from the cut dripped into the birch bark pot. Later that day, Moqua came back from the forest with a heavy basket of acorns. She was tired and glad to see that the pot was full of liquid and ready to make dinner in. She put a piece of venison in the pot, and boiled it by adding rocks heated in a fire.

Woksis came home from an unsuccessful hunt, and was still angry as he sat down to eat dinner. But as he took a bite of venison, a smile broke out on his face. It was the sweetest thing he had ever tasted! Woksis and his wife realized that it was the maple sap that had such a wonderful flavor.

Now all the tribe enjoyed the taste of maple syrup. Back in these early days, the sap of the maple was almost as thick and sweet as syrup. All the Indians had to do was make a gash in the bark of the maple tree, and stand with their mouth open and let the syrup drip in. The tribe became very lazy and fat. They spent no more time hunting or farming - all they wanted to do was lie under maple trees and drink sweet sap.

The Great Spirit looked down from his home in the sky and saw how lazy the tribe had become. He sent a great rain. It rained and rained for many days and nights. And it was a magic rain, for it entered the maple trees at the tips of the branches, and filled them up with water. The next time the Indians tasted maple sap it was watery and barely sweet. They had to boil off the water with much toil and effort. That is why even today maple sap looks and tastes almost like water - we have to boil it to make it taste sweet and thick. But we, like the tribe of Woksis, are still grateful for the sweet gift of the maple.